

THAT WHICH IS CLAIMED IS:

1 1. A method of enabling data access and manipulation from a
2 pervasive device, comprising steps of:
3 receiving a data access request from a pervasive device;
4 obtaining the requested data;
5 determining what data manipulation operations are available
6 for the obtained data, as well as a location of each available
7 data manipulation operation; and
8 returning the determined data manipulation operations and
9 locations to the pervasive device, in addition to the obtained
10 data.

1 2. The method according to Claim 1, further comprising steps
2 of:
3 requesting operation of a selected one of the determined
4 data manipulation operations; and
5 performing the requested operation, wherein the performing
6 step is executed by another device on behalf of the pervasive
7 device.

1 3. The method according to Claim 1, wherein the determining
2 step further comprises determining what data manipulation

3 operations are available for a content type of the obtained
4 data.

1 4. The method according to Claim 3, wherein the determining
2 step further comprises determining what data manipulation
3 operations are available for a user of the pervasive device.

1 5. The method according to Claim 3, wherein the determining
2 step further comprises determining what data manipulation
3 operations are available for a current location of the pervasive
4 device.

1 6. The method according to Claim 1, wherein the determining
2 step further comprises determining what data manipulation
3 operations are available for a user of the pervasive device.

1 7. The method according to Claim 6, wherein the step of
2 determining what data manipulation operations are available for
3 the user of the pervasive device further comprises obtaining
4 information about the user from a protocol header of the data
5 access request.

1 8. The method according to Claim 6, wherein the step of
2 determining what data manipulation operations are available for
3 the user of the pervasive device further comprises obtaining
4 information about access privileges of the user.

1 9. The method according to Claim 8, wherein the information
2 about access privileges of the user is obtained from a
3 repository which stores access privilege information.

1 10. The method according to Claim 1, wherein the determining
2 step further comprises determining what data manipulation
3 operations are available for a user group of which a user of the
4 pervasive device is a member.

1 11. The method according to Claim 1, wherein the determining
2 step further comprises determining what data manipulation
3 operations are available for a current location of the pervasive
4 device.

1 12. The method according to Claim 11, wherein the step of
2 determining what data manipulation operations are available for
3 the current location of the pervasive device further comprises
4 accessing a global positioning system ("GPS") function of the

5 pervasive device or a location registry associating the
6 pervasive device with a plurality of access points.

1 13. The method according to Claim 1, wherein the determining
2 step further comprises determining what data manipulation
3 operations are available for the pervasive device.

1 14. The method according to Claim 13, wherein information used
2 in the step of determining what data manipulation operations are
3 available for the pervasive device is obtained from a protocol
4 header which specifies types of content accepted by the
5 pervasive device.

1 15. The method according to Claim 13, wherein information used
2 in the step of determining what data manipulation operations are
3 available for the pervasive device is obtained from a protocol
4 header which specifies browser capabilities of a browser
5 operating on the pervasive device.

1 16. The method according to Claim 13, wherein information used
2 in the step of determining what data manipulation operations are
3 available for the pervasive device is obtained by analyzing
4 capability information provided by the pervasive device.

1 17. The method according to Claim 13, wherein information used
2 in the step of determining what data manipulation operations are
3 available for the pervasive device is obtained from a repository
4 which specifies capabilities of the pervasive device.

1 18. The method according to Claim 2, wherein the requested
2 operation is a file storage operation.

1 19. The method according to Claim 2, wherein the requested
2 operation is a print operation.
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4 0

1 20. The method according to Claim 2, wherein the requested
2 operation is one of a fax operation, an e-mail operation, a
3 project operation, or a voice mail application.
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1 21. The method according to Claim 2, further comprising the
2 step of annotating selected ones of the locations of the
3 determined data manipulation operations with an identifier of
4 respective ones of the obtained data.
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1 22. The method according to Claim 2, further comprising the
2 step of annotating selected ones of the returned data
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3 manipulation operations and locations with one or more cookies
4 which were present on the received data access request.

1 23. The method according to Claim 2, further comprising the
2 step of annotating selected ones of the returned data
3 manipulation operations and locations with one or more
4 parameters for use by the performing step.

1 24. The method according to Claim 23, wherein a selected set of
2 the parameters which are returned to the pervasive device and
3 provided in the requesting step and are then used by the
4 performing step.

1 25. The method according to Claim 23, wherein the annotating
2 step is performed by a protocol proxy component which receives
3 the data access request in the receiving step, and wherein the
4 annotating step is performed prior to operation of the returning
5 step.

1 26. The method according to Claim 25, wherein the determining
2 and returning steps are performed by the protocol proxy.

1 27. The method according to Claim 25, wherein the protocol
2 proxy receives requests and transmits responses using Hypertext
3 Transfer Protocol ("HTTP") messages.

1 28. The method according to Claim 25, wherein the protocol
2 proxy receives requests and transmits responses using Wireless
3 Session Protocol ("WSP") messages.

1 29. The method according to Claim 25, wherein the protocol
2 proxy receives requests and transmits responses using Simple
3 Mail Transfer Protocol ("SMTP"), Post Office Protocol ("POP" or
4 "POP3"), or Internet Message Access Protocol ("IMAP") messages.

1 30. The method according to Claim 25, wherein the protocol
2 proxy receives requests and transmits responses using a
3 synchronization protocol.

1 31. The method according to Claim 25, wherein the protocol
2 proxy is configured to accept requests from the pervasive
3 device.

1 32. The method according to Claim 25, wherein the protocol
2 proxy and the pervasive device communicate through a wireless
3 access point.

1 33. The method according to Claim 2, wherein:
2 the locations comprise address information for each
3 determined data manipulation operation;
4 the requesting operation step further comprises issuing a
5 request using the address information of the selected data
6 manipulation operation; and
7 the performing step further comprises executing a service
8 which is located using the address information of the issued
9 request.

1 34. The method according to Claim 1, wherein the returning step
2 further comprises returning at least one graphical symbol or
3 icon for particular ones of the returned data manipulation
4 operations and locations.

1 35. The method according to Claim 1, wherein the determining
2 step further comprises accessing a data structure to locate
3 information used by the returning step, wherein the data
4 structure stores information about the data manipulation

5 operations that are available for the obtained data and the
6 location of each available data manipulation operation.

1 36. The method according to Claim 35, wherein new data
2 manipulation operations are supported for use in the determining
3 step by adding information about the new data manipulation
4 operations and the location of each new data manipulation
5 operation to the data structure.

1 37. The method according to Claim 1, wherein the determining
2 step further comprises:
3 accessing a data structure to locate information used by
4 the returning step, wherein the data structure stores
5 information about the data manipulation operations that are
6 available for the obtained data; and
7 dynamically determining the location of each available data
8 manipulation operation.

1 38. The method according to Claim 37, wherein the dynamically
2 determining step further comprises evaluating at least one of
3 current processor load and current network conditions.

1 39. The method according to Claim 2, wherein the requesting
2 step is performed by a user of the pervasive device.

1 40. The method according to Claim 2, wherein the requesting
2 step is performed programmatically without intervention of a
3 user of the pervasive device.

1 41. The method according to Claim 2, further comprising the
2 step of programmatically requesting, by a protocol proxy, a
3 selected data manipulation operation on the obtained data, and
4 wherein the returning step returns a result of the selected data
5 manipulation operation as the obtained data.
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3 determining one or more selected data manipulation
4 operations that should be performed automatically on the
5 obtained data;

6 performing the selected data manipulation operations on the
7 obtained data, thereby creating transformed data; and

8 using the transformed data as the obtained data for the
9 step of determining what data manipulation operations are
10 available.

1 45. The method according to Claim 2, further comprising the
2 step of dispatching the requested operation, by a manager which
3 receives the operation request, to the other device prior to
4 operation of the performing step.

1 46. The method according to Claim 45, further comprising the
2 step of passing information to the manager along with the
3 operation request, wherein the passed information enables the
4 manager to ensure that the performing step operates on data
5 which is identical to the returned data.

1 47. The method according to Claim 46, wherein the passed
2 information comprises one or more cookies which are present in a
3 header of the data access request.

1 48. The method according to Claim 1, wherein operation of the
2 steps requires no additional software on the pervasive device.

1 49. The method according to Claim 1, wherein operation of the
2 steps requires no additional hardware on the pervasive device.

1 50. A system for enabling data access and manipulation from a
2 pervasive device, comprising:

3 means for receiving a data access request from a pervasive
4 device;

5 means for obtaining the requested data;

6 means for determining what data manipulation operations are
7 available for the obtained data, as well as a location of each
8 available data manipulation operation; and

9 means for returning the determined data manipulation
10 operations and locations to the pervasive device, in addition to
11 the obtained data.

1 51. The system according to Claim 50, further comprising:

2 means for requesting operation of a selected one of the
3 determined data manipulation operations; and

4 means for performing the requested operation, wherein the
5 means for performing is executed by another device on behalf of
6 the pervasive device.

1 52. Computer program instructions for enabling data access and
2 manipulation from a pervasive device, the computer program
3 instructions embodied on one or more computer readable media and
4 comprising:

5 computer program instructions for receiving a data access
6 request from a pervasive device;

7 computer program instructions for obtaining the requested
8 data;

9 computer program instructions for determining what data
10 manipulation operations are available for the obtained data, as
11 well as a location of each available data manipulation
12 operation; and

13 computer program instructions for returning the determined
14 data manipulation operations and locations to the pervasive
15 device, in addition to the obtained data.

1 53. The computer program instructions according to Claim 52,
2 further comprising:

3 computer program instructions for requesting operation of a
4 selected one of the determined data manipulation operations; and
5 computer program instructions for performing the requested
6 operation, wherein the means for performing is executed by
7 another device on behalf of the pervasive device.

1 54. A method of enabling a pervasive device to access and
2 manipulate remotely-stored data, comprising steps of:

3 receiving a data access request from the pervasive device;
4 obtaining the requested data;
5 determining what data manipulation operations are available
6 for the obtained data, as well as a location of each available
7 data manipulation operation; and
8 returning the determined data manipulation operations and
9 locations to the pervasive device, in addition to the obtained
10 data.

1 55. A method of accessing and manipulating remotely-stored data
2 from a pervasive device, comprising steps of:

3 requesting an access of the remotely-stored data from the
4 pervasive device; and

5 receiving the requested data at the pervasive device, along
6 with information about one or more data manipulation operations
7 that have been determined to be available for the obtained data.

1 56. The method according to Claim 56, wherein the information
2 further comprises a location of each available data manipulation
3 operation.

1 57. The method according to Claim 56, further comprising the
2 step of requesting operation of a selected one of the data
3 manipulation operations.

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